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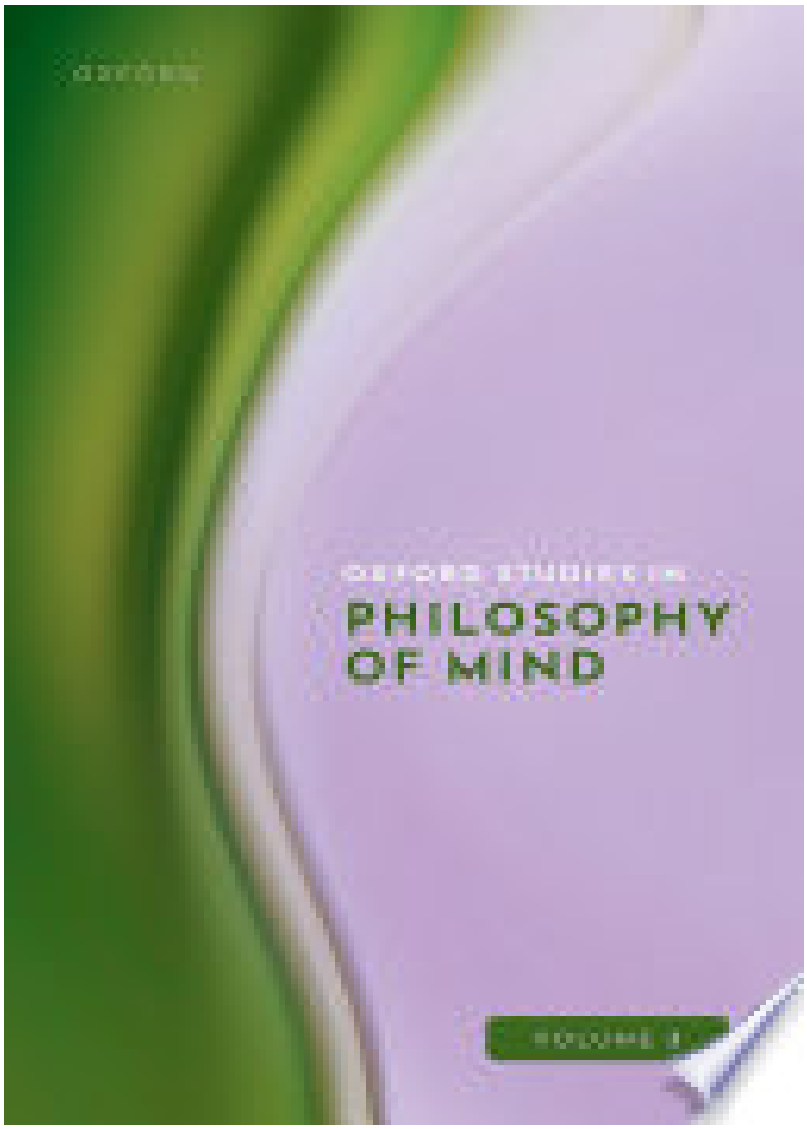

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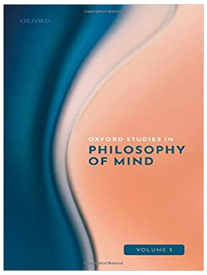

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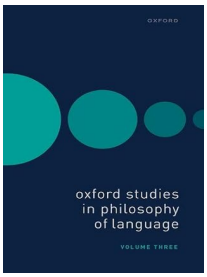

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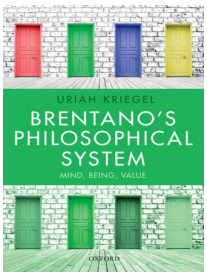

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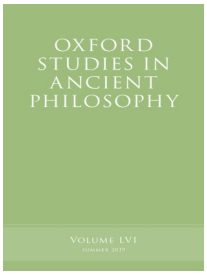

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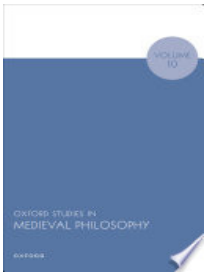

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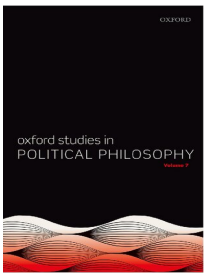

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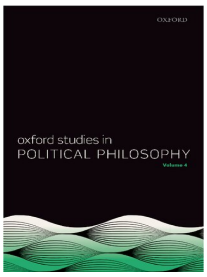

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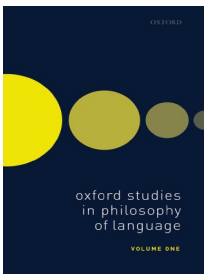

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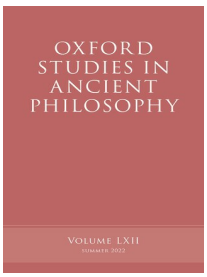

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Volume 1

Edited by

URIAH KRIEGEL

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Preface

This is the inaugural volume of Oxford Studies in Philosophy of Mind, a new annual publication dedicated to the philosophy of mind. Do we need another philosophy journal? It depends on what "need" means, but Oxford Studies in Philosophy of Mind will have certain unique features that separate it from other journals.

First, each volume will combine invited articles and articles selected from submissions. Writing a philosophy paper often involves a familiar tradeoff between rigor and control on the one hand and boldness and innovation on the other. The blind-review process notoriously biases toward the former.

The purpose of invited articles is to offer contributors the freedom to fashion their own optimum point for this tradeoff. At the same time, the purpose of allowing submissions to the jorunal is to ensure access to younger scholars, perhaps from lesser-known universities or working in parts of the world of which the English-speaking world, including this journal's editors, may be less aware.

Second, and relatedly, for most of us, when we start reading a philosophy paper, our deepest hope is not that the paper will turn out to be flawless; rather, we hope it will contain some insight that will trigger breakthroughs in our own thinking on the topic, or lure us to start thinking about it if we have not yet. Yet when we wear our referee caps we tend to automatically slide into flaw-detection

mode. Oxford Studies in Philosophy of Mind will consciously try to skew toward the insightful at the expense of the flawless.

Third, each volume of Oxford Studies in Philosophy of Mind will highlight two themes, but will also publish articles outside those themes. The purpose of the highlighted themes is to generate clusters of ideas surrounding a single topic, with the thought that the juxtaposition of perspectives on one issue will intensify interest. At the same time, the openness to submissions from outside these themes will serve two purposes. One is to allow themes that are organically gathering momentum in the philosophy-of-mind community to bubble up to the journal's awareness. The other is to create space for talent Copyright © 2021. Oxford University Press USA - OSO. All rights reserved.

and its intellectual idiosyncrasies. Many topics that magnetize much aca-demic activity at one point start out a decade earlier as comparatively isolated spurts of ideas, typically by younger scholars.

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Fourth, the philosophy of mind has for at least half a century been torn between a traditional, armchair-led approach and a naturalistic, empirically driven approach. The most prestigious general philosophy journals tend to favor the traditional approach, while journals dedicated to the philosophy of mind, such as Mind & Language and Philosophical Psychology, tend to favor the naturalistic approach. Meanwhile, the history of philosophy of mind gets no play in philosophy-of-mind-dedicated journals, and is published mostly in history-of-philosophy journals. Oxford Studies in Philosophy of Mind will publish work from all three sectors: armchair philosophy of mind,

empirically driven philosophy of mind, and history of philosophy of mind.

Fifth, as far as invited contributions are concerned, Oxford Studies in Philosophy of Mind will observe a strict gender balance, with exactly half of the invitees being women and half men. It does not control, of course, the ultimate delivery of manuscripts by the invitees, nor the quantity and quality of submissions from each gender. (This combination of factors accounts for the unfortunate paucity of chapters by women in the inaugural volume.) Sixth, the processing of submissions will follow a different procedure. All submissions without exception will receive a verdict within a fortnight, pending force majeure. Anonymous referees will come into this process only at this stage, and will be involved even after a paper has been accepted for publication. The idea is to treat anonymous input, by carefully selected referees, as a means to improve a paper rather than a way to push authors in directions they are not intrinsically interested in.

Seventh, the journal is paired with an annual conference, hosted by Rice University's School of Humanities, featuring a combination of forthcoming and prospective papers. Just like anonymous review, presentation to a wide audience of specialists can be invaluable in improving a paper; this is one more tool to push articles appearing in Oxford Studies in Philosophy of Mind toward excellence.

We hope that these peculiarities of Oxford Studies in Philosophy of Mind will result in an exciting publication that will be of interest to all parts of the philosophy-of-mind community and beyond. In this inaugural volume, the two highlighted themes are "the value of consciousness" and "naturalism and physicalism," while four articles concern issues outside these two themes.

The first theme—the value of consciousness—garnered more attention Copyright © 2021. Oxford University Press USA - OSO. All rights reserved.

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among submissions, and six of the volume's thirteen chapters concern it. It features a long foundational article by a seminal thinker on this topic, Charles Siewert; a defense, by Roger Crisp, of the stark thesis that absolutely Oxford Studies in Philosophy of Mind Volume 1, edited by Uriah Kriegel, Oxford University Press USA - OSO,

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all value is grounded in the phenomenology of pleasure and pain; a phenomenological analysis of the experience of fulfillment, which Hyunseop Kim takes to ground (when fitting) a meaningful life; an argument, developed by Diane O'Leary, that medicine is better framed not as concerned with fixing the body but rather as targeting improving one's bodily phenomenology; and two articles, by Matt Duncan and Chris Ranalli, offering two distinct perspectives on the singular epistemic value of conscious experience (for Duncan, experience is knowledge, though knowledge-by-acquaintance rather than propositional knowledge; for Ranalli, experience provides us with an intrinsic epistemic good that goes beyond truth, namely cognitive contact with reality).

Regarding the second theme—naturalism and physicalism—the volume includes an innovative analysis of the essence of naturalism by Lok-Chi Chan, which highlights the role of contingent historical paths in what we consider intuitively as "naturalistically kosher," as well as two important articles on physicalism by Jonathan Schaffer and Karen Bennett: Schaffer leverages the notion of ground to generate a twentieth-century version of functionalism, Bennett develops a new, explanatory argument against dualism.

Three other chapters in the volume bundle somewhat organically around the issue of content: Anil Gomes and Matthew Parrott seek a

workable way to draw the line between internalism and externalism about content, Antti Kauppinen offers a novel account of the intentionality of pain, and Adam Pautz tries to generate a total theory of content from the combination of phenomenal intentionality and Lewis's theory of interpretation. The last chapter in the volume is by Peter Adamson and is historical, examining the role of certain dualist arguments in medieval Islamic philosophy.

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I

THE VALUE OF CONSCIOUSNESS

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Consciousness

Value, Concern, Respect

Charles Siewert

1. What Good Does Experience Do Us?

More specifically: does it bring a value of its own to us? Is it good for us in its own right? I should be clear right off: I'm not asking what good we get just from having some experience or other (no matter what kind). I am happy to concede some experiences do us no good at all.[1] But if that's so, you may think the answer all too obvious. "So you're asking whether there is some experience that's nice to have just in itself? Sure, there is. For example: tasting chocolate—that's one—or feeling the relief of taking off my shoes, that's another. Next question!"

But bear with me. What I want is not just to secure acknowledgement that there is some type of experience intuitively good "in itself" for us to have.

I want to clarify what it means to say experience has this sort of value, and by doing so lead us to find it—not just in this or that obvious case of sensory pleasure or relief—but in forms of experience that pervade our lives. I then want to show how to use this recognition to place experience at the heart of what makes our lives worth living to us. And this I want to do, without discounting our desire that we not merely have experience, but that it reveal to us the world beyond itself and engage us with others. Finally, I want to show how it can figure fundamentally in our concern and respect for each other, and in the irreplaceable value we accord a person's life. Carrying out this agenda fully calls for a more elaborate treatment than I can now provide.

But I do aim here to make enough of a case to merit serious consideration and inspire discussion.

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[1] Thus I am in basic agreement with Lee's (2018) position (though he there takes my earlier work to maintain the contrary view).

2. What I Mean by "Experience"

I use the word "experience" to pick out what otherwise might be called a

"state of consciousness"—what is sometimes marked by the qualification subjective experience. And I will be drawing on a fairly liberal view of what that encompasses. I realize the conception I employ would not be granted by all. However, there just is no standard view of what consciousness is, and what forms it takes,

both free of controversy and meaty enough to help us deal extensively with questions about its value. So it won't do to discuss these matters without being upfront about one's starting points, even if I must here offload a detailed defense of mine to other ventures, past and future.

The use I will make of the word "experience" is to be distinguished from others that are common. If someone says something was "an experience" for them, we might ordinarily take them just to mean it was something they were affected by in a way likely to seem remarkable or salient. For example, you may describe either an airplane flight or meeting your in-laws as "an experience" in this sense. But I am using the term "experience" for states of consciousness—and I would not put plane trips or in-law encounters in that category. Note, however, that the "salient ways of being affected" sense of

"experience" does lead to the other, consciousness sense. For the ways of being affected we typically find salient include what I'd call subjective experiences. For example: your feeling as you did when the plane suddenly lost altitude, or when your in-laws asked about your religion. And these feelings are experiences in the "subjective," and not just the "affected-by"

sense. What makes that so? I would say: these "experiences," these feelings, coincide with your feeling them—that is, with your experiencing them.

There's a sense in which you "experience" a feeling just in case you feel it, and the feeling itself is nothing apart from experiencing/feeling it. (By contrast: neither the airplane flight nor the in-law encounter coincides with someone's experiencing it, in any sense.)

Attention to what you feel when you feel pain, nausea, elation, anxiety, fatigue, giddiness, restlessness, and so on, provides a good

place to start in clarifying what a "subjective experience" is. But the category is not confined to states naturally described as "feelings that you feel." For when something looks to me located, colored, lit in a certain way, when it sounds, tastes, smells somehow to me, or when an object feels to me somehow (slippery, bumpy, Copyright © 2021. Oxford University Press USA - OSO. All rights reserved.

smooth, rough)—I also experience these appearances and feelings in this

"coinciding" sense, even if it would be odd to say I "feel" them. For example, how I experience the visual appearance of a word on this page alters,

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depending on whether I am looking right at it or at the word just next to it.

This is not just to say I am differently affected by its looking to me as it does: for there's a difference in how I experience the appearance that coincides with (and isn't an effect of) its looking to me as it does. This looking, this visual appearing, is also then a "subjective experience."

I follow a widespread practice in saying that states conscious in this sense are states with "phenomenal character." How your feelings feel to you, and more generally, how your experiences are experienced by you—that constitutes their "phenomenal" (or "subjective") character. I will also speak of

"phenomenal features" in this context—as features you have just when you experience experiences in this "coinciding" and not just

"affected-by" sense.

And I take a conscious state/experience just to be an instance of a phenomenal feature.

I also endorse the widespread notion that for a state to be "subjectively experienced" or "phenomenally conscious" is for there to be "something it's like" for one to be in it, in a certain sense. For instance, my tasting durian fruit is a subjective experience inasmuch as there is something it's like for me to taste durian. What is the relevant, "conscious-marking" sense of this phrase? I regard two points as essential.

(1)

When I wonder, "What would it be like for me to taste durian?," I want to understand what it would be for me to taste it, and to understand this in the way I could claim to acquire through tasting it myself, and could seek to have by trying to imagine tasting it. Thus to say there is "something that it's like for someone" to have a feature in the relevant sense is to say that it is suitable for you to claim or desire to understand what it is for them to have it in a way that is found or sought in "taking up the subject's point of view." To say the understanding is found or sought through "taking up the subject's point of view" means: it is found in self-attribution of the feature, or sought in imagining having it. Where what it is to have a feature is suited for the type of understanding or curiosity that is, in this sense, "subjective," there is something it's like for its possessor to have it.

(2)

Something is a phenomenal feature (a feature whose instances are experiences or conscious states) just in case there is unconditionally something it's like for one to have it the sense just explained. Consider: there may Copyright © 2021. Oxford University Press USA - OSO. All rights reserved.

sometimes be something it's like for someone or something to eat durian—

but not unconditionally. For there might be a durian-eater for whom there was nothing that was like. Maybe this is the case with caterpillars that infest

durian orchards, for example. (That is, maybe their ingestion of durian offers nothing for subjective understanding or curiosity to target.) By contrast, there is always something it's like for one to taste durian—no matter who or what tastes it, or when they do so. That's why tasting durian is (but eating durian is not) a phenomenal feature.

So, there are features there is unconditionally something it's like for one to have. This, on my account, means features whose possession is unconditionally suited for subjective understanding or curiosity. Those are the phenomenal ones—and their instances are conscious states, subjective experiences.

By appeal to this conception, we have another way of explaining what's meant by "phenomenal character." Experiences so understood differ in phenomenal character just when they differ with respect to what it's like to have them. And that means they differ with respect to what makes their possession suited for a subjective understanding or curiosity. This aligns with the previous account of phenomenal character: for such states differ with respect to what it's like to have them just when they differ in how they are subjectively experienced.

I have so far illustrated subjective experience with examples of sensory (e.g., visual) appearances, and of feelings. But I will assume a richer conception of what all subjective character includes or

encompasses than this makes clear. So, for example, where visual experience is concerned, I will take it that we subjectively experience not just "color sensations," but visual appearances of depth and object constancy, which make it possible for the location of things in our surroundings to become apparent to us: we experience "locational appearances." Moreover, the character of my experience not only makes apparent to me where things are, it makes what they are apparent to me by making them "appear recognizable" to me as of this or that kind. What it's like for something to "look recognizable to me as a hat,"

for example, differs from what it's like for something (perhaps the same thing) to "look recognizable to me as a basket."[2]

As I see this, something may look recognizable to someone as an F without their being fully competent in using the concept of an F. I do also think, however, that when, on some occasion, I understand a phrase in certain way (as I may in different ways understand the expression "He is a man of many hats"), how I understand the phrase is not removable from how Copyright © 2021. Oxford University Press USA - OSO. All rights reserved.

[2] For more on my conception of "recognitional appearances," see Siewert 2019.

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I experience the episode of thought or understanding. (Think of what it's like for you to switch understanding of this and other ambiguous phrases.) There is, on my "inclusive" view, no sense in which we can hold constant what it's like for us to have the experiences of understanding had in thinking, speaking, reading, and listening, while occurrent understanding is itself utterly switched

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CHAPTER XXVIII.
OF THE MORE REMARKABLE SERPENTS.

Paraguay contains full twenty kinds of serpents, all differing in name, colour, size, form, and the nature of their poison. Those most commonly known are the Mboŷtiñi, or Mboŷchiñi, the Quiririò, the Yacaninà, the Mboŷhobĭ, the Mboŷquatia, the Mboŷpe-guazù, or Cucurucù, the Mboŷpe-miĥi, the Yboyà, the Tareŷmboyà, the Mboŷguazù, or Yboyà, the Mboŷroŷ, the Curiyù, the Ybibobocà, the Yacapecoayà, the Yararacà, the Cacaboyà, &c. The Mboŷchiñi, or Rattle-snake, which is remarkable for its venom and the tinkling appendage to its tail, is about the thickness of a man's arm at the elbow, and often as much as five feet in length. It has a forked tongue, a flat head, little blackish eyes, four teeth in the upper jaw, besides other unusually acute and incurvated ones, from the hollows of which it darts poison at all it meets. Some lesser teeth are visible when the animal opens its mouth. The colour of the back, which is much deeper at the sides, is a dusky yellow, varied with yellow lines intersecting one another at the spine. It is covered with dusky scales, like those of a crocodile, but softer. The belly is of a yellowish colour, with rather large and almost parallelogram scales: at the extremity of the tail is situated that rattle from which it takes its name, and which is composed of a smooth, dry, cinereous material, the breadth of a man's thumb. Here and there it has a small hollow cell divided in the midst by a thin membrane, containing a little ball not perfectly round, which, being agitated by every motion of the serpent, and shaken against its receptacle, makes a sound like the wooden rattle which children use. Every year a fresh joint grows on to the rattle, as in stags-horns, connected with vertebræ, like the

chains of a ring. From the joints of the rattle you may tell the age of the serpent, as you may that of a stag from the branches of his horns. Hence the older the serpent the more it rattles. This snake when angry coils itself up; when purposing an attack it moves along the ground so swiftly that it almost seems to fly. Providence has fastened that tinkling appendage to its tail in order to warn others from approaching it, for its poison is justly accounted the most virulent of any; the remedies which prove efficacious against the bites of other serpents, have been found unavailing against those of the rattle-snake, which causes certain but slow death, the deadly poison gradually diffusing itself through all the members. It takes away the use of the foot, arm, ear, and eye on that side which has been bitten, and presently, passing to the other, causes extreme torture, continual delirium, and acute pains, especially at the extremity of the feet and hands, which contract a cadaverous paleness from being deserted by the blood, which is rendered torpid by the coldness of the venom. All this I observed in two Guarany youths who were bitten by a rattle-snake. Both were under eighteen years of age, both were robust and of strong constitutions. The first struggled with his pains twelve days, the other fourteen, at the expiration of which period they both died, the strength of the poison baffling the virtue of the most established remedies. Whenever I heard of any person's being bitten by a rattle-snake I immediately prepared him for death, by administering the sacrament to him, before the delirium began. An Indian woman, in the flower of her age and strength, was reduced to the last extremity by the pestilential bite of one of these rattle-snakes. However, to the astonishment of all, she escaped death, but having lost the use of her limbs, dragged on a miserable existence for many years.

A letter dated Williamsburg, a town of Virginia, September the 28th, 1769, and published in the German newspapers of the 6th of Jan. 1770, tends greatly to confirm the virulence of the poison of the rattle-snake: the contents are as follows. "In Johnston county, North Carolina, at the latter end of June, a rattle-snake crept into a house, where four children were lying on the ground, the youngest of which

it bit with its poisoned teeth. The father, awakened by the screams of the child, ran to render it assistance, and was at the same moment wounded by it himself. Meantime, whilst he was seeking some weapon to slay the deadly animal, the other three children were also wounded. With the utmost haste and diligence all sorts of remedies were applied to the wounded, but in vain, for the father and his four children expired next day." Has not then nature, you ask me, supplied a remedy powerful enough to expel this deadly poison? She may perhaps have afforded many which human ingenuity has not yet discovered, but which are at any rate unknown to the Paraguayrians. I am not ignorant that books do speak of medicines for this purpose, which they extol as divine, but all who have used them have found them of no avail. The Brazilians make use of little gourds, by which the poisoned wound is enlarged and dried. Sometimes they bind the wounded member with the rush Jacapè to prevent the poison from spreading. They sometimes cauterize the wounded part. Before the poison reaches the heart the sick man is induced to sweat by drinking Tipioca. Some Indians place much faith in the bruised head of a noxious serpent applied to the wound, which they also bathe in fasting saliva. But whether these remedies ever saved the life of any one who has been bitten by this most venomous snake I must be allowed to doubt. However destructive the teeth of these serpents are when employed to bite, they become salutary when used as medicine: for they say that the Brazilians prick their necks with them to ease the pain of the head-ache. They think it useful to anoint the loins, and other parts of a sick person's body, as well as swellings, with the fat of this snake. Its head also, when tied to the neck of the sick man, is said to cure pains in the throat. This method of healing was unknown to us in Paraguay.

The next to this in noxious qualities is a snake twelve, and sometimes fifteen feet long, with a large body the colour of ashes, varied with little black spots, yellowish under the belly, and formidable on account of a peculiar poison it contains and introduces with its bite. The Brazilians call it Cucurucù, the Guaranies Mboÿpè guazù; and from its effects I guess it to be the same as that which

Pliny calls Hæmorrhoam, and others Hæmorrhoida. This snake is most abundant where heat and moisture, the generators of serpents, predominate. Its poison heats the veins, and expels the ebullient blood from the mouth, nose, ears, eyes, finger-nails, in a word from all the outlets and pores of the body. This is related by Patricio Fernandez, who asserts that few persons are killed by this serpent, because most part of the poison flows out with the blood itself. For my part I never saw any serpent of that kind, nor any person that had been bitten by one, though I understand that they are not unfrequent in Brazil, where the Indians apply the head of the serpent to the wound it has inflicted, by way of a cataplasm; fresh tobacco leaves slightly burnt are used for a cautery. The roots also of the Caapia, Jurepeba, Urucù, Jaborandỹ, &c. are used to create perspiration. They say that, when the head of this serpent, in which greatest part of the poison lies, is cut off, the flesh is eaten by the savages of Brazil. In Paraguay, besides the Mboỹpè guazù, you meet with the Mboỹpè miî̃, which is scarce thicker than a quill. Though smaller, it is more poisonous than the larger serpent of the same name.

The Yacaninà is to be reckoned amongst the larger and more dangerous serpents. It is two, sometimes three ells long, and as thick as a man's arm. It raises itself upon the last joint of its tail, and leaps upon people almost as if it were flying. The Quiririô terrifies the bravest with its very aspect. The size and colours of its body, and the strong poison it contains, are the occasion of this terror. The Mboỹhobĭ, of a dark green colour, spotted with black, very large both as to length and breadth, and pregnant with the most noxious poison, infests all the plain country. On the other hand, the Mboỹquatia is chiefly found within the walls of houses. It has obtained its name from the beautiful variety of its colours. It is middle-sized, but of a very virulent poison. In the rivers and lakes water-snakes of various shapes and monstrous size wander in great numbers. They are thought not to be venomous, though formidable to swimmers; for their horrid teeth never leave loose of any thing they have once got hold of. They squeeze animals to death with the

folds of their bodies. Of the number of these is the Mboŷroŷ, called by the Guaranies the cold serpent, because it loves cold places and shade. Another is the Curiyù, eight, and often nine ells long, and of breadth corresponding to such great length. This water-snake affords the Indians a dainty repast. Remarkable above the rest is a serpent of enormous size, but perfectly innocent in its nature. The Ampalaba is thicker than a man's breast, and larger than any water-snake. It is of a light reddish colour, and resembles the trunk of a very large tree covered with moss. As I was travelling through the territory of St. Iago, at the banks of a lake near the river Dulce, my horse suddenly took fright. Upon my enquiring of my companion the occasion of the animal's terror, he replied, "What, Father! did you not see the Ampalaba snake lying on the shore?" I had seen him, but had taken him for the trunk of a tree. Fearing that the horse would be alarmed and throw me, I did not think proper to stay and examine the great sparkling eyes, short but very acute teeth, horrid head, and many-coloured scales of the monster. These serpents live under water, but come frequently on shore, and even climb lofty trees. They never attack men, and it is most likely that they are devoid of poison. All however agree that Ampalabas are fond of rabbits, goats and does, which they attract with their breath, and swallow whole. As it must require an enormous throat to swallow a doe, you will perhaps think an equal facility of mind necessary to believe the fact. I candidly own that I never saw it done, but should not venture to doubt the truth of a thing that has been affirmed by creditable authors, and eye-witnesses.

CHAPTER XXIX.
MORE ON THE SAME SUBJECT; AND RESPECTING OTHER INSECTS.

The Jesuit Eusebius Nierenberg speaks of a stupid snake, which, from the description, I take to be the same as the Ampalaba. "It is the thickness of a man," says he, "and twice as long. It inhabits rocks and caves, (perhaps when rivers and pools are wanting,) and feeds upon animals, which it attracts with its breath. Some Indians, in travelling, sat down upon it, taking it for the trunk of a tree; and it was not till the snake began to move that they perceived what an unstable and terrific seat they had chosen. It is however reputed harmless. These snakes are of such vast size, that eighteen soldiers sat down upon one, thinking it to be a log of wood. They lie in wait for stags, which they attract by the force of their breath, a power they do not possess over men. After squeezing the stag to death, they lick it all over from head to foot, in order that they may swallow it more easily; but suffer the head, which the horns prevent them from swallowing, to remain in their mouth till it putrefies. Ants sometimes enter the open mouth of this snake and kill it."

I must not omit to mention an immense snake, which the Guaranies call Moñaў. In its vast size, wide mouth, sparkling eyes, row of threatening teeth, and spotted scaly skin, it resembles a dragon. Father Manuel Guttierrez, when he travelled through the Tarumensian wilds, saw a monster of that kind in passing the banks of the river Yuquirў. An Indian, his companion, threw a thong used for catching horses round the animal's neck and strangled it. The

Indians of St. Joachim were not so courageous, for when sent forwards by me to prepare the way for the royal governour, who was coming that day, they returned home in great trepidation, because they had seen the Moñaў snake lurking in a very thick grove at the banks of a rivulet. Being asked the cause of their alarm, they described the horrible spectacle they had seen. A few days after I had an opportunity of witnessing the truth of the matter myself. A report being spread that the governour was coming next day, we went out to meet him, and as soon as ever I approached the rivulet where the snake had lately been seen, my horse suddenly began to foam, kick, and run away. The Indians were all of opinion that he perceived the monster lurking in its cave by the scent. The reason why the Moñaў does so little mischief is because it generally inhabits hidden groves, solitary shores, or caves far from human sight.

Though serpents of every kind wander up and down, yet some seek lurking-places under the water, some amongst grass and trees, and others only within the walls of houses and hollow places. The Mboўquatia inhabits the chinks of ruinous walls. Numbers of these snakes were killed in the church at St. Joachim, but as fresh ones grew up, they were never entirely got rid of. I would advise you never to sit down incautiously in fields, woods, and banks of lakes, without first examining the place. The Indians, who neglect this precaution, are often bitten by lurking serpents. Fatigued by a journey which I and my companions had taken on foot through the woods of Mbaeverà, they had lain down at evening in a place where I observed decayed posts of palms, and the remains of huts scattered up and down the ground. I advised them to examine the spot with care, and to remove the hewn palms, the receptacles of noxious reptiles, for the safety of their lives. They followed my injunctions. Under the first stake they discovered an immense serpent sitting upon seventeen eggs, and on that account the more dangerous. Presently another, and then more, appeared in sight. The eggs consist of a thin white skin, instead of a shell, and resemble an acorn in shape, though larger.

I have often wondered that certain of the ancients recommended fire to keep off serpents, having found them, on the contrary, to be attracted by it. We continually see them creep to the fire, and steal into warm apartments for the sake of the heat. Virgil has justly given snakes the epithet of *frigid*. The more copious and virulent their poison is, the intenser is the cold they labour under. Hence, in persons bitten by serpents, the blood congeals, and the extremities of the body stiffen and grow cold, as the circulation cannot reach them. That serpents love heat we know from daily experience. In the deserts we often were obliged to pass the night in the open air: on these occasions, no sooner was the fire kindled than we saw the snakes concealed in the vicinity approach to warm themselves. Whenever the south wind renders the nights rather cold, they creep under the horse-cloths lying on the ground. When the earth is chill, serpents climb on to the roofs of houses to bask in the sun, and thence are induced by the sharp night-air to slip into the apartments below, to the imminent danger of the occupants. When lights are brought into a room of an evening, the doors should be carefully shut; for the serpents in the neighbourhood, spying the light, immediately enter the house. These animals suddenly make their appearance in apartments built of brick or stone, and covered with tiles, when the door and windows are close shut, and not a chink is left unstopped. One of my companions had such a dread of serpents, that he never dared take any sleep till he had examined every corner of his apartment. There are some snakes which leap at all they meet, and bite ferociously. Paraguay also produces some harmless ones, which are either devoid of poison, or the desire to use it, unless they be offended.

Who does not know that some serpents lay eggs, whilst others produce a numerous living offspring? The Americans believe that young serpents grow from the dead bodies of the old ones. Hence, whenever they kill any serpents they remove them to a great distance from their houses, and do not throw them on the ground, but hang them on trees or hedges. In Brazil, two Jesuit missionaries found a horrid-looking dead snake to which a young live one was

clinging, and, on their shaking the carcass with sticks, eleven little serpents crawled from it. This account of serpents is closed by three insects, akin to each other in the quality of their venom. The Scolopendra, which has a smooth cylindrical body a span long, twice as thick as a man's thumb, and covered with a hard, cinereous skin, approaching to a cartilage, abounds with legs from head to foot, which I neither had power nor inclination to count. It contains a poison almost equal to that of a serpent, and its bite causes much both of pain and danger. After spending eighteen years in Paraguay, I at length saw and felt an animal till then known to me only by name. It bit me as I was asleep, and on waking, I perceived that the space between the little and ring-finger, first looked red, and afterwards began to swell and grow painful. The tumour and inflammation hourly increasing, I could no longer doubt but that some venomous little animal had bitten me. Early in the night I heard an unusual noise amongst some tools that were lying under a bench in my room. Bringing a light, I discovered and killed the Scolopendra which had bitten me, and next day suspended it in our court-yard, and showed it to the Indians, who all declared that they had often seen and dreaded that animal in houses, fields, and banks of rivers. Do not confound the Scolopendra with the Oniscus, which is a dusky round worm, two inches in length, and scarce thicker than a goose's quill. The body is covered with rough yellow hairs. On the head you see here and there a double row of white spots. It has eight short thick feet. Whichever part of the body it touches it violently inflames, which certainly proves it to be venomous. The Paraguayrian scorpions are said to differ nothing from those of Europe in appearance, but their poison is milder and more easily cured. I think that scorpions must be very rare in Paraguay, since, after spending eighteen years there, and traversing greatest part of the province, I never saw one, nor heard of any person's being bitten by one. I remember that a Spaniard appointed to guard the cattle in the town of Concepcion, when lying sick at our house, was frightened by a scorpion, which put out its head two or three times from the wall, and that he passed a sleepless night in consequence, always keeping a knife in his hand against the threatening animal.

Spiders of various forms and sizes are every where to be met with. Venomous ones with flat bodies may be seen creeping along the walls. You should take the greatest care to avoid that very large kind, which the Spaniards call *arañas peludas*, hairy spiders. The body of this insect, which is about three inches in length, is composed of two parts. The fore-part is larger than the other, almost two inches long, an inch and a half wide, and somewhat compressed. The hind-part is more spherical, and in size and form resembles a nutmeg. A hole in the back supplies the place of a navel. It has two sparkling eyes: its long, and very sharp teeth, on account of their beauty, are set in gold by many persons, and used as toothpicks. The whole skin of this spider is covered with short blackish hairs, but as smooth and soft as silk. It has ten long legs divided by more or fewer joints, and entirely hairy, each of which ends in a forceps, like that of a crab. When angry, the insect bites. The bite, though scarce visible to the eye, is discovered by a certain moisture, a livid tumour, and the severe pain it causes. We have found the venom of spiders prove not only dangerous but mortal: remedies efficacious in cases of serpent-wounds have scarce saved the lives of persons bitten by this large spider. These insects lurk chiefly in hedges, hollow trees, and ruined walls.

CHAPTER XXX.
OF REMEDIES FOR THE POISONOUS BITES OF INSECTS.

Old books suggest various methods of keeping away serpents: but who that is acquainted with America would not despise the prescriptions of the old writers, adapted to fill pages only, not to be of any real use? In preference to these ancient recipes I recommend the American ones, both because they are more expeditious and readier, and because their utility has been proved by long experience. The Christian Guaranies, whenever they accompanied me to seek the savages in the woods, carried fresh garlick in their girdles, and, notwithstanding the abundance of serpents we met, not one of my companions was ever bitten by one. Following the example of the Indians, I always kept a string of garlick suspended near my bed, after being attacked by a serpent in my sleep. That serpents dislike the smell of garlick is well known both to the ancients and to country people, who rub the milk-pans with the juice of that herb, lest serpents, who are extremely fond of milk, should get into them. My faith, however, in the efficacy of garlick was not a little shaken by one of my companions, who found a snake in the garden close to a plant of it. But the leaves of a plant are endued with different properties from its roots and fruit. May not the garlick alone, and not the leaves, be the object of the serpent's abhorrence? The Abipones and Mocobios suspend a crocodile's tooth from their neck or arm, thinking it a powerful amulet against snakes of every kind. In this they are imitated by many Missionaries and Spaniards, who often purchase the teeth of these animals at a high price. I have known Spaniards who thought themselves secure from the

bites of serpents when they had a bit of deer's skin about their body. There are persons who rub their feet and hands with the juice of a radish, and believe themselves fortified against poisons. I should not take upon me to despise these safeguards, because they are approved by the experience of the Americans; but it is the part of a prudent person never to place such entire confidence in them as to lay aside caution, and lose sight of danger, which, in regard to serpents, lurks where none appears.

For this reason I constantly exhorted the Americans to circumspection; when they had to rest in the plain at night or mid-day, to choose a situation free from bushes, reeds, and caverns, and at a distance from the banks of pools and rivers; to take a survey of the spot; to examine the tall grass, decayed trunks, and recesses of shrubs and rocks, before they sat or lay down. The Indians, who neglect these precautions, are constantly liable to the bites of serpents. Throwing themselves carelessly on the ground, they sleep soundly without a fear or a thought about serpents, and are often awakened with a scream by the bite of one. When travelling bare-footed they employ their eyes in watching birds in the air and monkeys in the trees, when they ought, at every step, to examine the dangerous ground they are treading. The Abipones, from being an equestrian people, and more circumspect, seldomer suffer from serpents than the Guaranies, who always walk on foot, and use less caution. In the town of St. Joachim, where the climate is very hot, and the land is surrounded with marshes, rivers, and woods, venomous animals are unusually numerous. Scarce a week passes that some Indians are not bitten by serpents. During the eight years that I spent in this town a vast number of persons were bitten by various serpents, but, with the exception of two youths who were killed by a rattle-snake, not a single individual died: all were healed by the use of one and the same remedy. Now listen attentively whilst I make you acquainted with that celestial, and almost miraculous, medicine, which is as unknown out of Paraguay, as it is useful to the Paraguayrians. It is a very white flower, extremely like a lily in its leaves, stalk, blossom, and scent, except that it is smaller. The

Spaniards call it *nard*. It grows in all soils, flourishes at every part of the year, and is neither destroyed by long drought, nor by hoar frost. I never could meet with this flower either in European gardens, or in books treating of flowers, and have found the most scientific herbalists utterly unacquainted with it. After diligently examining every species of nard, I perceived that the Paraguayrian nard could not be referred to any of them. The root of this flower, either dried or fresh, is cut into small pieces and steeped in brandy. Part of this infusion, together with the root, is applied to the wound, and the rest taken inwardly by the patient. It is generally sufficient to do this once. But if it be necessary to repeat it a second and a third time, the force of the poison is destroyed, the swelling subsides, and the wound heals. The sooner you apply this remedy, the quicker and more certainly you will repress the progress of the poison. Taught by the experience of eighteen years, I affirm it to be superior to all other remedies. With it we have triumphed over the poison of every snake but the rattle-snake. I cannot count the number of Indians I have healed with this precious root. An Indian Guarany, as he was lying on the ground out of doors, was bitten by a serpent. When the poor wretch crawled to my town I prepared him for death with sacred rites, which the violent pain of the swelled wound, and the cries extorted by it from the wounded man seemed to presage. I had only a few drops of brandy remaining: these, with the root of the nard, I applied to the wound. Afterwards, as the extreme pain indicated that the poison was not yet expelled from his body, I saw him recover in three days by the use of the root with wine, which I substituted for brandy.

No one will deny that tobacco leaves possess much virtue against the bites of serpents. A Guarany was wounded in the right foot in two places by a snake, as he was reposing at noon on a journey. I was asked for medicine, and as no nard was at hand, and we were many leagues from the town, I advised the father of the wounded man to put a tobacco leaf into his mouth, and to suck both the wounds. He replied that he had already done so; I then told him to burn tobacco leaves, letting the smoke enter the wounds, and to

apply a cataplasm of chewed tobacco to the same; I also desired the wounded man himself to chew tobacco, swallow its juice, and smoke it through a reed, giving him likewise a vial of brandy to drink. The poison at length was so much repressed by these trifling remedies that the sick man recovered his strength sufficiently to pursue his journey to the town. The warmth of the brandy counteracts the cold of the poison, and restores the heat of the stomach and of the blood. Father Gumilla declares that serpents will die if a tobacco leaf be thrust into their mouths. We learn from the same author that, in the new kingdom of Granada, the Americans drink gun-powder mixed with brandy to cure the bites of serpents, and that it produces the desired effect. The Abipones, Mocobios, and Tobas, as soon as they feel themselves bitten by a serpent, cover the wound with virgin wax, which is thought to absorb the poison. At another time they have it sucked out by their physicians. They sometimes scrape a crocodile's tooth, drink the dust in water, and at the same time bind a whole crocodile's tooth very tight on to the open wound. Our druggist at Cordoba, wishing to try the virtue of this remedy, gave an equal quantity of violent poison to two dogs, tying a crocodile's tooth round the neck of one, and not round that of the other, and they say that, whilst the latter died in a very few hours, the former recovered by means of the tooth. The Abipones surround the neck of a dog that has been bitten by a serpent with ostrich feathers, and they told me that their ancestors looked upon that as a remedy.

The Portugueze extol the *piedra de cobra*, which is of a grey, and sometimes of a black colour, and of various sizes, as the magnet of poisons: for in the same manner that loadstone attracts iron, this stone, when applied to a wound, absorbs all the venom. That it may serve again for the same purpose it is immersed in milk, into which the poison is discharged. The ancient physicians thought garlick an excellent remedy for venomous bites. The efficacy of this plant against poisons was proved by an experiment of my own. A Guarany, as he was working in the garden, was bitten in the foot by a hairy spider, such as I have described, and imprudently neglected to mention the circumstance. The poison beginning to operate, he

felt his thigh swell, with pain in the stomach, and suspecting his danger, came to me for advice. I ordered a little beef broth to be boiled with plenty of garlick, which taken by the sick man immediately repressed the poison, the swelling, and the pain. Nor am I averse to the prescription of Dioscorides, who thinks that radish juice should be drunk on these occasions. The ancients have advised washing the hands with the same, to keep off the attacks of serpents. For it appears, both from the authority of physicians and from experience, that not only the juice but the very smell of a radish is of use against serpents. Some bind a live hen, or pigeon, cut open, to the wound, thinking that the poison is absorbed by them. In place of a hen some substitute a kid, or the belly of a goat newly slain. Some wash the wounded part with goat's milk, and they say that a countryman cured a serpent wound in the foot by dipping it often into goat's milk. They also say that cheese made of this milk, when applied to the wound, will have the same effect. To these old remedies America adds new ones, a few of which I will mention. They apply the unripe fruit of the anana, when bruised, to poisoned wounds by way of a cataplasm. The Indian physicians give the herb *taropè*, (which the Spaniards call *contra yerba*, or *higuerilla*, the little fig, because its roots have both the odour and the milk of the fig,) to their patient to eat or drink, to counteract the effects of poisons. The leaves of the herb *mboỹ-caà* are chewed, and the juice swallowed, whilst part of the chewed leaves are placed on the wound. The *macângua caà* is celebrated for possessing a virtue of the same kind. This herb is named from the duck *macângua*, which, using its wings as a shield, pursues and kills serpents, but if it be wounded in the contest eats this herb as a medicine. The *yçipo moroti*, and *bejuco de Guayaquil*, have the same property. The roots of the *urucuȳ*, *jurepeba*, *jaborandi*, &c. are highly conducive to excite perspiration, by which the poison is expelled. I do not deny the validity of these remedies, but, with the leave of physicians, ancient as well as modern, I still think nard root preferable to them all, for it has been the salvation of numbers, not only of men, but of beasts. As the cattle feed in the open air, day and night, every part of the year, they are not unfrequently bitten by serpents, scolopendras, and spiders.

Blood dropping from the nostrils is the sign of a poisonous wound. Brandy mixed with nard root poured in time down their throats was of great use, but after the poison had diffused itself over all the members of animals we generally found medicine unavailing.

CHAPTER XXXI.
OF OTHER NOXIOUS INSECTS, AND THEIR REMEDIES.

You might swear that Egypt, and the whole plague of insects with which divine vengeance afflicted that land, had removed into Paraguay; nay, you will find many here more mischievous and troublesome than Egypt ever beheld. I have always thought common house-flies, resembling ours in external appearance, more to be dreaded and shunned than serpents, scorpions, scolopendras, hairy spiders, &c. Do not imagine this to be an hyperbole: I declare it as my serious opinion. Swarms of these insects are always flying up and down. At home and abroad you will see yourself surrounded by these hungry little animals, which, though a hundred times repulsed, will return as often. They enter the ears of persons when they are asleep, and creeping to the interior of the head, lay great numbers of eggs, which breed quantities of worms; these insects hourly increase in number, and gnaw all the flesh and moisture in the head, so that delirium and final death are the inevitable consequence, unless a remedy be applied. I knew a Spaniard whose whole face together with the nostrils was consumed, the forepart of his head being made as hollow as a gourd by worms. One fly, which had crept into his nose whilst he slept, was the origin of the worms and of his misfortune. This is no rare occurrence. That worms are expelled by the application of tiger's fat you have already learnt from the twenty-second chapter of this history: but hear further. In the town of the Rosary, one of the Abipones swarmed with worms to a shocking degree; but these insects, unable to endure the tiger's fat which I applied to them, gnawed open two outlets, and all burst

away, leaving the sick man in perfect health, and ascribing his recovery to this potent medicine; by the aid of which I cured a female captive of the Spaniards, whose head had been grazed by a bullet. The bloody and lacerated skin as usual attracted these flies, which, making a passage to the interior of the head, greatly endangered the poor woman's life, but were soon dislodged by the application of tiger's fat. We have benefited other persons, at various times, with the same remedy. I took care always to have a good supply of a medicine so important, and in such constant request. At the first news of a tiger being slain I hastened to get its fat, which I kept melted in a little vessel; for if raw, it would soon putrefy in so hot a climate. Though the fat of these animals, even when fresh, like the rest of the flesh, exhales a most abominable odour, yet when mixed in water, it is drank by the Abipones with the utmost avidity. In some of the Guarany Reductions, peach leaves are used to expel worms bred by flies.

The natives of northern regions will hardly conceive, and natural historians scarce credit the breeding of such dangerous worms from flies; but the Americans witness it daily, and deplore its fatal effects not only on themselves, but on cattle. When we killed a cow or a sheep at sun-rise, the flies have been seen swarming round the flesh; soon after we have found it covered with a kind of whitish seed, and by sun-set the meat became stinking, full of worms, and unfit to be eaten. Those who wish to preserve meat uninjured, should either cut it into very small pieces and dry it in the air, or hang it up in the shade in a net, or wicker basket, so that it may be exposed to the air, without being accessible to flies. Should a horse's back be injured by the hardness of the saddle, or by long riding, the flies will swarm thither as if bidden to a feast, and breed innumerable worms, which mangle the horse, and in a few days destroy him. Blood bursting from an ulcer is a sign that worms are within. In order to remedy this they tie the animal's feet and throw him on the ground, then dig out the worms and matter with a slender stick, and fill up the hole of the ulcer with chewed tobacco-leaves, and cow-dung. This must be repeated for many days. If the

animal can lick himself the cure will be surer and quicker. But as this method of healing is accompanied with much trouble and some danger, the Indians, and half Spaniards, who are more lazy than the Indians, had rather see the plain strewed with carcasses, than exert themselves either with their hands or feet. The slothfulness of the shepherds who take care of the estates yearly occasions the loss of many thousand horses, oxen, calves, sheep and mules in Paraguay. New born calves should be examined and rid of the worms, with which they are generally infested; for the flies immediately attack the navel string, and miserably kill them. On which account, if, out of ten thousand calves born yearly on your estate, four thousand remain alive, you have great reason to congratulate yourself, and return thanks to your shepherds.

I should not omit to mention another worm medicine. Szentivan advises you to give a drench of olive oil and water to oxen labouring under this disease, as it causes them to void the worms along with their excrement. I had formerly read of this, and remembering the prescription, adopted it in America with success, before I was acquainted with the virtues of tiger's fat. I had a great mastiff dog, remarkable for beauty, strength, and courage, my faithful guard both at home and abroad, but somewhat quarrelsome. He provoked daily battles, and was constantly victorious, till one day when he was attacked by a number of hounds at once; the wound which they made was infested by worms, so that, as he would not suffer it to be touched, we had no hopes of his recovery. After applying a very few drops of oil to the wound, I beheld the whole brood of worms issuing forth, and caught hold of them as they protruded themselves from the skin, with a pair of compasses. When the worms ceased to break out, I poured on oil again and again, till none remained in the hollow of the wound, and by this art the dog recovered in two days. The same oil, in a lukewarm state, is poured into the ears, to get away any gnat, flea, or fly, which may have crept into them. I will tell you of a false alarm I once had on this account. As I was dressing in the morning, I heard a continual humming so near me, that I thought a fly must have entered my head; a suspicion which

gave me much anxiety. Every thing was tried, without success, to expel the fly, which still continued its deadly hum. At last, oil heated in a shell was poured into my ear by a boy, but, from being too hot, it caused me extreme pain. Yet still greater was my consternation at finding that the humming was not discontinued. "Come," said I to the boy, "put your ear close to me, and listen attentively to the buzzing of this wretched insect." The boy listened for some time, and then said with a smile: "you need be under no apprehension, Father; the fly is in your clothes, not in your ear." Immediately undoing the buttons, I pulled away the coat from my neck, and the fly, which had been confined in the fold, joyfully flew away. I cannot express the delight I felt at finding myself free from this danger. It was a long time, however, before I could forget it; the obstinate pain in my ear, occasioned by the hot oil, every now and then reminding me of the captive fly. I must here mention another remedy. If ever you feel any insect enter your ear, you should make some other person syringe it well with cold water; for the little insects, oppressed by the wet, will either come out, or perish immediately.

In certain parts of Paraguay, especially in the Tarumensian territory, you meet with another species of fly. In size and shape they differ little from our common flies, but are of a white colour, and have a formidable sting, which, when inserted into the flesh of man or beast, elicits a quantity of blood. I scarce ever remember seeing them in houses; they chiefly infest the roads, where they are excessively troublesome to horse travellers. There is a great number and variety of gad-flies, in plains adjacent to woods, but these insects attack beasts only. I am not surprized at the fable of Io being driven mad by a gad-fly, having so often seen horses and mules, tractable at other times, tormented by gad-flies adhering to their skin like leeches, till they grew quite furious, and lost all control over themselves, and regard for their riders. Still greater danger is experienced in the woods from certain large wasps, the sting of which perfectly infuriates the horses. To free themselves from these cruel tormentors, they often refuse to obey the bridle, and throw their rider, rushing onwards, and rolling themselves on the ground; a

circumstance which occasions many broken legs, and bruised heads, and much bloodshed. I, myself, though riding on a very gentle mule, should have been killed once owing to this circumstance, had not an Indian come to my assistance. These insects attack men also. Their sting occasions violent pain and great swelling. A piece of fresh turf is generally applied to the wounded part, by way of remedy, but it never did me any good, as my cheek may testify. In my absence, a great number of wasps flew into the yard of our house, and settled upon a stake, forming themselves into a large round ball. Lest passers-by should disperse them, and they should fly into our apartment, I fired a gun into the ball of wasps. Terrified at the sudden report, they all flew away except one, which pitched upon my face, and inserting its sting into the flesh, caused it to swell dreadfully. The tumour was succeeded by a corresponding degree of pain. On my complaining the next day, and mentioning the remedies I had used, an old Abipon said, "Why did you not anoint the swelling with beef fat, Father? that is an old and certain remedy amongst us." I complied with this advice, in consequence of which the swelling and pain both ceased. Take notice that I do not mean suet, but the fat of the animal, which is used in Paraguay in the place of melted butter. How dangerous it is to provoke hornets, we have often found in travelling. A nest of these insects concealed under the leaves had perhaps been disturbed unintentionally by the Indians, who preceded me as we were walking in the woods; but they did not escape with impunity, not a few being stung by the hornets dispersed in this manner. Most of them, however, rushed under my clothes, and would have stung me all over, had I not given my garment to the Indians to examine and shake.

No arithmetic is sufficient to reckon the number of gnats that torment this country, as no patience is equal to enduring them. Wherever you go, they afflict your ears with their noise, and your flesh with their stings, making you wish for a hundred arms to drive them away. During cold weather, they remain quietly in their lurking-holes, but when the sun is hot and the air tranquil, they fly out in search of food, and are never more ferocious than at dawn or

twilight. Where the grass is high, where bushes, pools, rivers, or marshes are near at hand, and where there are thick woods which exclude the air, there you will be plagued by vast numbers of serpents, and swarms of gnats. If you have to pass the night in such a situation as I have described, never dream of sleeping. After the fatigue of riding or walking the whole day, you will fruitlessly weary both hands at night with driving away gnats. Unable to sleep, how often have I reproached the sun with returning too slowly! I pitied the horses which, after being debilitated with toil and fasting, were surrounded by such a swarm of hungry gnats, that, as they could neither take any rest, nor graze the herb, they stood round the fire to inhale the smoke, which, if rather sharp, will keep off those trumpeting insects. Gnats cannot endure the smoke of cow-dung; but besides that it will have the same unpleasant effect upon your own nostrils, if your sense of smelling be not very dull indeed; you will hardly meet with cow-dung in the woods, where there is not so much as the shadow of a cow, and travellers through these deserts are too much laden with provisions, water, and fuel, to be able to carry bundles of it with them. I was much pleased with the ingenuity of a Negro, who, when he slept on a journey, always had at his side some resinous material from rotten wood, which glistens at night, smokes gently without any unpleasant smell, and, as I observed, always defended him from gnats. Incredible is the annoyance caused by these insects in a long journey. We have often returned home mangled, swollen, and bloody, in short, so unlike ourselves, that we could hardly know one another. Even in the house, if you do not wish to pass a sleepless night, you should not suffer the door or window to remain open at sun-set, especially when you light a candle; for they fly by swarms to any light, whenever they can find access to it. There is a species of gnats which are smaller, but more mischievous than the common kind; for though they have not the disagreeable hum of the others, they creep into the mouth, ears, and nose, and sting violently.

The most famous gnat in Paraguay, the *mbarigué*, is of the smallest size. Its extreme diminutiveness renders it invisible to the acutest

eye, yet its sting is intolerably painful. These insects infest the thicker woods and the banks of streams, and are most to be feared in the evening, when the air is still. Their sting is like the point of a weapon, with which they pierce the flesh, not only when it is naked, but when defended with a slight covering. After passing some time in the woods, we returned to the town so covered with red spots, that we looked like persons in the small-pox. When in this state, the skin cannot be safely scratched with the nails, or washed with cold water. From the repeated stings of this gnat, large worms are often bred, whether originating in the pestilent sting, the poisoned humour, or some seed left by the insect, or in the gnat itself, converted into a worm within the flesh, I cannot tell. That more than one worm is never bred in one place, I know, the proof of which you shall now hear. I had observed my dog howl every now and then, scratching himself and appearing very uneasy. The Indians, when consulted on the matter, answered that he was swarming with worms. Under my inspection, they tied the dog's mouth and feet, laid him on the ground, and pressing the flesh where it appeared swelled with both hands, squeezed out the worm concealed underneath. Seventeen worms were thus taken from as many different places, all of a white colour, thicker than the seed of an apple, and about the length of a man's thumb nail. Astonished at the circumstance, I was told by the Indians that it frequently happened to themselves. And, indeed, all Paraguay knows that the minutest worms and flies have been the death of many persons. Father Felix Villa-Garzia, during his long search for the Ytatinguas in the Tarumensian woods, contracted a disorder in his eye, and was tormented by a fistula and the worms engendered therein for the rest of his life: that the heat of the sun, and various kinds of gnats were the occasion of this disorder, is well known.

CHAPTER XXXII.
CONTINUATION OF THE SAME SUBJECT.

The hotter parts both of North and South America breed a little worm, the daily cause of many groans, and not a few deaths. In appearance, and in its manner of skipping, it resembles the smallest of all possible fleas, and is hardly visible to the keenest eye, except in a very strong light, but so pungent that it must be felt by every one that is not made of stone or iron. This insect has so sharp a proboscis that it will pierce shoes, boots, gaiters, and every kind of clothing. It adheres a little while to the skin, and then penetrates the flesh, causing an intense itching: concealed there, as under a burrow, it surrounds itself with a round whitish little bladder, which it fills with eggs like the smallest nits. If this bladder remain many days under the skin, it increases to the size of a pea. This is a common sight. The longer the bladder adheres to the body, the more is the sense of pain deadened. Children are much the fittest to rout this enemy from his station, for the strong sight they possess enables them immediately to discover the little red spot which denotes the place where the worm has entered the flesh. The circumference of that spot they prick with a needle, gradually open the skin and flesh, and at length pluck out the whole bladder with the little worm buried amongst its nits. When this is put to a candle, it goes off with a noise like gunpowder. But if the bladder be broken in the operation, the humour effused from thence will occasion further pain, and the nits, by being scattered, will breed fresh worms in the same place. That this gnat teems with poisonous matter is evident from the circumstance that the hollow from which it has been eradicated, not unfrequently inflames, swells, and, unless quickly remedied,

becomes gangrenous. The nails of the feet, which they frequently attack, always decay and fall off, and, to preserve life, it is often necessary to amputate the toes. Those who wish to guard against this inconvenience, should study cleanliness in their houses, for the said worms derive their origin from dust, excrement, and urine in a hot climate, and are bred in places which are seldom swept, which have been long uninhabited, and where the cold air has no access to dry the moisture. The stalls of oxen, horses, and mules, though in the open air, and without a roof, swarm with them. In the southern parts of Paraguay, where the air is not so hot, this noxious insect is unknown; indeed it is seen no where but in the territories of Buenos-Ayres, and Cordoba of the Tucumans. After passing six years in Paraguay, I was only acquainted with it by name, and it was not till my removal to the colony of St. Ferdinand, that I began to see, to suffer and to execrate this pest. Persons who live in a place infested by these insects, should have their feet daily examined; for however troublesome this inspection may be, much greater inconvenience will be incurred by the neglect of it. At one sitting a boy will often take out twenty or more worms, and when your fingers and nails are almost all filled with holes, and the soles of your feet so lacerated as to prevent you from walking a step without difficulty, you will yourself deplore your neglect and procrastination. I have known many persons confined to their beds for weeks, and others entirely deprived of the use of their feet on this account. Though these worms chiefly attack the feet, yet they sometimes, with still greater danger, creep to the other parts of the body, and make their nest in the arm or knee. Dogs, from their always lying on the ground, are most troubled with these insects; but they dexterously remove them from their flesh with their tongues, and heal the wound by licking it. Sows, tame monkeys, cats, goats, and sheep, are dreadfully tormented by them; but horses, asses, mules, and oxen, are protected against the common enemy by the hardness of their hoofs. The Americans should take care to fill up the hollow left by the bladder with tobacco-powder, ashes, or soap, otherwise the wound made by the needle, and infected with the poison of the insect, will become ulcerous, conceive matter, and, on occasion of

inflammation, or violent motion of the feet, will end in a gangrene, or St. Anthony's fire. Hen's fat and a cabbage leaf applied to the feet, to allay the inflammation, have often been found of service. They write that the Brazilians, to keep off these worms, anoint their feet with an oil expressed from the unripe acorns of the acaju. Sailors daub themselves with pitch for the same purpose. All of us, in the fear of these and other insects, wore sheepskin leggings, but we found them weak and inefficient defences.

The common fleas of Europe, diffused like æther throughout every part of the air, are not only bred in Paraguay, but domineer most insolently here, as in their native soil. It is a remarkable circumstance that the plain itself, which is covered with grass, swarms with fleas. Persons sailing on the Paraguay, when they leave the vessel to pass the night or noon on the shore, though they lie on a green turf, where no man or dog ever trod, will return to the ship blackened with fleas. If this occurs in the green plain, what must we expect in the dry floors of an apartment, covered neither with brick, stone, nor board? In apartments of this kind have I dwelt seven years amongst the Abipones, during which time I had to contend with countless swarms of fleas. Do you enquire the remedy for fleas in America? There is but one, namely, patience. Columella, Kircher, and others, are indeed of opinion that these insects are not only driven away but destroyed by a decoction of odoriferous herbs scattered on the floor; and the Guaranies do certainly boil for this purpose a strong-scented herb, sprinkling the chamber with the water when boiling hot, and sweeping it once or twice. But if the fleas are destroyed by this means, I attribute it, not to the strong smell of the herbs, but to the water in which they are boiled, and to the mops by which they are swept away. Let the houses be cleared of dust and dogs, and rendered pervious to frequent winds; these are the best precautions against the smaller insects. Lice are never to be met with amongst the Abipones, except in the hair. The Spanish colonies abound in bugs, but I never beheld one in the towns of the Indians. Flying bugs, called *binchuccas*, are common in Cordoba, and other parts of Tucuman. By day they lurk in the chinks

of roofs and chests, but fly out at night and make bloody war upon sleepers. They affect the part upon which they fasten with an intolerable heat, seeming rather to burn than bite the body. The red spots caused by the pain appear as if they had been raised by a caustic. Fatigued with fifteen days hard riding, through a continuous desert, and amid unceasing showers, I reached the town of Salabina, where repose was not only desirable, but almost indispensable for me; yet the whole night passed away without my being able to obtain a wink of sound sleep. I felt all my limbs pricked and heated, but was unable to discover the cause of this unusual pain. When day-light appeared, all who saw me covered with red spots pitied my misfortune, and assured me that the flying bugs were the cause of it. In another journey I passed the night in company with a noble priest, who, after we had partaken of a light supper, set out with me and his domestics to sleep in a neighbouring field. In that part of the country this is both customary and necessary, for in hot nights the houses swarm with bugs to such a degree that it is impossible to get any sleep in them.

Amongst pernicious insects no inconsiderable place should be assigned to the *garrapata*, which is about the size of a lentil, and in form resembles a land tortoise, except that it is more spherical, wearing on its back a mail like that animal. It is of a dark tawny colour, partly variegated, has a flat body, eight little feet, and a prominent head or proboscis, which it inserts into the skin, fastening, at the same time, the hooks of its feet into it, and whilst it sucks blood from every part of the body, creates an itching and inflammation, followed by swelling and matter, which often lasts four days or more, while the ulcer will hardly heal within a fortnight. When the insect has fixed its head deep into the flesh, it is very difficult to pull it out entire; and if it remain sticking in the flesh you will be in a bad condition; for the venom will not be got rid of till matter has flowed for a long time from that itching ulcer. The plains and woods are filled with this insect, so hostile both to man and beast. Where you see rotten leaves, or reeds, there you will find swarms of this little animal. When we travelled in the woods to

discover the hordes of the savages, we disregarded tigers, serpents, and caruguàs, in comparison with these noxious insects: it was our constant complaint that we had not eyes enough to avoid them, nor hands sufficient to drive them away. The Spaniards employed in seeking the herb of Paraguay, when they daily return to their hut, lay down the bundles of boughs with which they are laden, and hasten to the next lake or river to bathe, where, having stripped themselves naked, they examine one another's bodies, and pluck out the garrapatas sticking in their flesh; unless this precaution were adopted, they would be killed in a few days with the superabundance of matter, and of ulcers. Goats, does, monkeys, tamanduas, dogs, and every wild animal that inhabits the plains or woods, all swarm with these insects. The lesser garrapatas are much more mischievous than the larger ones.

There are many species and incredible numbers both of creeping and flying ants in Paraguay. The worst and most stinging kind are the least in size, and of a red colour. They carry off sugar, honey, and every thing sweet, so that you have need of much ingenuity to defend provision of this kind from them. From eating sweet things they increase their bile, and acquire a subtle venom. As soon as they get upon the skin, they create a pustule, which lasts many days, and causes severe pain. To this very small species of ants, I subjoin the largest I had an opportunity of seeing, which are formidable on account of their undermining buildings. They make burrows with infinite labour, under churches and houses, digging deep sinuous meanders in the earth, and exerting their utmost strength to throw out the loosened sods. Having got wings they fly off in all directions, on the approach of heavy showers, with the same ill fortune as Icarus, but with this difference, that he perished in the sea, they on the ground, to which they fall when their wings are wetted by the rain. Moreover those holes in the earth, by which the ants used first to pass, admit the rain water, which inundates the caves of the ants, and undermines the building, causing the wooden beams that uphold the wall and roof, first to give way, and unless immediately supported, to fall along with the house. This is a common spectacle

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